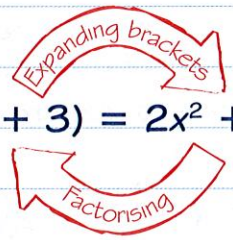
A* A B C D

Factorising

Factorising is the opposite of expanding brackets:



You need to look for the LARGEST FACTOR you can take out of every term in the expression.

$10a^2 + 5ab = 5(2a^2 + ab)$

This expression has only been PARTLY FACTORISED.

$10a^2 + 5ab = 5a(2a + b)$

This expression has been COMPLETELY FACTORISED.

Factorising $x^2 + bx + c$

You need to write the expression with TWO BRACKETS.

You need to find two numbers which add up to 7... $5 + 2 = 7$

$x^2 + 7x + 10 = (x + 5)(x + 2)$

... and multiply to make 10 $5 \times 2 = 10$

When factorising $x^2 + bx + c$, use this table to help you find the two numbers:

b	c	Factors
Positive	Positive	Both numbers positive
Positive	Negative	Bigger number positive and smaller number negative
Negative	Negative	Bigger number negative and smaller number positive
Negative	Positive	Both numbers negative

Factorising $ax^2 + bx + c$

$2x^2 - 7x - 15 = (2x \quad)(x \quad)$

One of the brackets must contain a $2x$ term. Try pairs of numbers which have a product of -15. Check each pair by multiplying out the brackets.

$(2x + 5)(x - 3) = 2x^2 - x - 15$ ✗

$(2x - 3)(x + 5) = 2x^2 + 7x - 15$ ✗

$(2x + 3)(x - 5) = 2x^2 - 7x - 15$ ✓

Difference of two squares

You can factorise expressions that are written as

(something)^2 − (something else)^2

Use this rule:

$a^2 - b^2 = (a + b)(a - b)$

$x^2 - 36 = x^2 - 6^2$

$= (x + 6)(x - 6)$

36 is a square number.

$36 = 6^2$ so $a = x$ and $b = 6$

Worked example

Factorise fully

(a) $x^2 + 3x$ grade D

$x(x + 3)$

(b) $x^2y + xy^2$ grade C

$xy(x + y)$

EXAM ALERT!

More than 60% of students got part (b) wrong.

Make sure that the expression is factorised fully:

$x(xy + y^2)$ ← partly factorised

$xy(x + y)$ ← completely factorised

Check it!

$xy(x + y) = x^2y + xy^2$ ✓

This was a real exam question that caught students out – **be prepared!** ResultsPlus

Now try this

In part (f) start with $6f^2 - 10f + 4 = 2(3f^2 - 5f + 2)$

edexcel

(a) Factorise completely $12x^2 - 18xy$ **(1 mark)**

(b) Factorise $a^2 - 9b^2$ **(1 mark)**

(c) Factorise $6x^2 - 9xy$ **(1 mark)**

(d) Factorise $2x^2 - 7x + 6$ **(2 marks)**

(e) Factorise $(p + q)^2 + 5(p + q)$ **(2 marks)**

(f) Factorise $6f^2 - 10f + 4$ **(2 marks)**

grade C grade A